

People, Wildlife, and Ecosystems: Health for One, Health for All

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"We will never escape the ecosystem and the limits of the ecosystem. Whether we like it or not, we are caught in the food chain, eating and being eaten. It is one of the conditions of life."

– WILLIAM H. MCNEILL

The field of ecological health recognizes that the physical well-being of people, nonhuman animals, and their habitats are inseparable. This is a profoundly different notion from the conventional view of health, in which physicians, nurses, and others treat human ills; veterinarians tend to the health of livestock, pets, and wildlife; and conservation biologists and ecologists address habitat health. But the more we learn about health, the more ludicrous these artificial divisions become.

- All influenza genes – including those that caused the catastrophic 1918-1919 pandemic – are maintained in the aquatic bird population. Periodically, these viruses are reshuffled and transmitted to other species by farming practices or other human interactions with the environment.
- HIV1, the virus causing the AIDS pandemic, originated in chimpanzees. It is widely believed that the jump to humans occurred because of hunting and eating chimpanzees and other human incursions into chimpanzee habitat.
- The dramatic emergence of Lyme disease stems largely from urban sprawl, which both put people in closer proximity to deer and white-footed mice and actually increased the populations of these tick-carrying animals.
- Each year, nearly 75,000 people are infected with – and 600 die from – *E. coli*, a virulent new form of an old organism that can produce a potentially lethal toxin and has developed an increased ability to survive the acidic caldron of people's stomachs. The emergence of acid-resistant *E. coli* appears to be related to the feeding of a high-grain diet to cattle since WWII. The largest recorded outbreak of toxic *E. coli*, at a New York fairground in September 1999, was linked to well water contaminated by flooding.

Environmental toxicants, like infectious organisms, also ripple through ecosystems, sometimes changing the fundamental nature of those systems. The effects of PCBs on human health are well documented. Lesser known is the fact that killifish in PCB-laced

waters near a Superfund site in New Bedford, Massachusetts have become resistant to PCBs and are passing their resistance genes to offspring. Similar genetic changes are happening in fish near PCB sites in New Jersey, Virginia, and Connecticut.

ECOLOGICAL HEALTH VERSUS CONVENTIONAL HEALTH

Three qualities distinguish ecological health from conventional paradigms of health. First, it is interdisciplinary, recognizing that a comprehensive understanding of health requires collaboration among human-health professionals, animal-health professionals, and ecologists. The mysterious outbreaks of West Nile virus in New York, *Pfiesteria* in the Southeast and Mid-Atlantic regions, and hantavirus in the Southwest were solved only because all these fields brought knowledge to bear.

Secondly, ecological health views human health as an extension of healthy natural systems, not separate from them. When a region's mammalian wildlife begins to suffer from new infectious or toxic-related diseases, more likely than not human mammals will also be affected. We require the same healthy ecosystems to sustain us.

Thirdly, ecological health is evolutionary in that it realizes that achieving sustainable health is not just about finding a cure. Living a healthy life means applying knowledge, medical technology, and individual behavior to outwit our pathogenic adversaries. We need to create environmental pressures that cause them to evolve into less dangerous organisms. Conventional medicine often eliminates relatively benign organisms, thereby inviting in more pathogenic ones. Antibiotic overuse is but one example.

ECOLOGICAL HEALTH AND BIOTERRORISM

Although a slow trend toward thinking ecologically about health has been under way for at least a decade, concerns about bioterrorism will likely hasten the integration of an ecological health perspective into medicine, public health, agriculture, and other fields. This is because insects, birds, mammals, and other animals can be used to introduce dangerous biological agents, some of which move between people and nonhuman animals. Biological threats to animal agriculture, an important economic sector, are a central part of this new concern. "Agroterrorism"

agents could include a range of highly contagious illnesses affecting swine, sheep, cattle, goats, and birds. If foot and mouth disease became established within the United States, it would cost more than \$27 billion annually in trade losses alone, without considering the costs of lost animals, disinfecting premises, quarantines, surveillance, and higher meat prices.

A 2000 report by the General Accounting Office (GAO), considering the West Nile virus outbreak for lessons about public health preparedness, concluded: “Links between public and animal health agencies are becoming more important. Many emerging diseases...affect both animals and humans. So do many viruses or other disease-causing agents that might be used in bioterrorist attacks.”

OPPORTUNITIES FOR FUNDERS

Ecological health offers health grantmakers a powerful conceptual framework for bridging constituencies, expanding the capacity of existing organizations, bringing science to bear on public policy, promoting interdisciplinary research, informing conservation practices, training medical professionals, and developing sustainable approaches to public health. Several strategies follow.

- **Building New Alliances.** Environmental and public health advocates have long expressed a desire to work together but there are deep differences in their priorities. Ecological health can help bridge these by demonstrating the commonalities of wildlife, human, and ecosystem health. The approach also holds the potential for building wider coalitions among public health advocates and health professionals, the land conservation and ecosystem protection movement, and the animal health and dignity movement.

One model of a nonprofit advocacy-based ecological health collaboration is the Campaign to Keep Antibiotics Working. With the goal of addressing the overuse of antibiotics in livestock, the campaign includes Environmental Defense, Union of Concerned Scientists, Center for Science in the Public Interest, Humane Society of the United States, and Physicians for Social Responsibility, among others.

There are also opportunities for grantmakers to build bridges between their own health and environment programs, which often are disconnected. The Bush Foundation, for example, has developed a specific ecological program to integrate the foundation’s interest in health, environment, and agriculture.

- **The Land Conservation Movement.** There is a concerted effort among forward-looking land conservation organizations to evolve from the so-called buy-and-fence approach to one that integrates the physical and psychosocial needs of the human community into the preservation or management of habitats, both wild and suburban. This approach requires broadening the rationales for land conservation from arguments based upon recreation, resource conservation, and economics to one with broader public appeal, such as health. Organizations addressing “smart growth” and “sprawl” are making explorations in this direction.

- **Research.** Most biomedical research is so costly that only the largest foundations, industries, or government sources can support these endeavors over the long term. But there are

numerous opportunities to support promising short-term, low-cost research at the intersection of human, animal, and ecosystem health. There also is a need to identify and prioritize key research at this nexus.

- **Conservation of Biological Diversity.** An argument can be made that the Endangered Species Act is also a disease prevention act. Currently, imperiled species are often prioritized according to their rarity, with the closest to extinction getting the most federal and private support. But a systematic prioritization based upon the potential contributions of species to human health would likely be far more effective for protecting more species and especially the ecosystems in which they live (as well as building enduring public support for conservation).

- **Health Professionals in Practice.** Only a few hours of the many years of training required to become a physician are devoted to studying the ecological components of health and illness. Grantmakers can help make the case and fund developmental work to incorporate ecological information into curricula, knowledge, and clinical practice.

- **Federal Funding and Health.** There is a significant mismatch between the national expenditures for health care and the actual determinants of health. According to the federal Centers for Disease Control and Prevention, environment accounts for a 20 percent influence on health, yet for only 8 percent of federal health care spending. Ecological health could provide a more scientific and less political rubric for matching allocations of public dollars with the true causes of illness. In addition, the key federal research agencies have few mechanisms for funding at the nexus of human, animal, and ecosystem health. Private foundations can both fund this cross-cutting interdisciplinary research and develop strategies to push federal funding agencies in this direction.

CONCLUSION

By stressing ecological interdependency, ecological health offers a powerful rationale for changing how public and private institutions formulate and enact health and environmental policies, and make funding decisions. Most importantly, this field will influence people’s individual dealings with other species and with each other because it honors human beings as members of a larger family of living things. As we more fully acknowledge our membership, our benefits will grow. So will our obligations.

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